

# **Carbon Dioxide Trading Program (Rev. C17)**

## **Proposed Regulation**

## **BACKGROUND: Executive Order 57**

- June 2016: Governor McAuliffe issued EO 57 directing the Secretary of Natural Resources to convene a Work Group to develop recommendations to reduce Virginia's carbon emissions *under existing state authority*
- Work Group held 6 meetings (8/31/16-2/28/17)
  - 40 presentations
- Three month public comment period (2/1/17-4/30/17)
  - 8,000 written comments

## **BACKGROUND: EO 57 Work Group recommendations**

- May 12, 2017: Group Report to the Governor
- "The Work Group received a number of presentations and written comments from stakeholders advocating for a regulation to limit carbon dioxide emissions from power plants. These comments included recommendations that the Commonwealth join or participate in the Regional Greenhouse Gas Initiative (RGGI) or another regional trading program, that a price be put on carbon, and that Virginia strive to reduce its greenhouse gas emissions by 30 to 40 percent by the year 2030."

## **BACKGROUND: EO 57 Work Group recommendations**

- "There was tremendous public interest in this particular recommendation. Although many stakeholders provided feedback focused on specific in-state targets (such as 30x30), the Work Group believes that it is important and necessary that Virginia work through a regional model, like the established and successful RGGI, in order to both achieve lower compliance costs and address the interstate nature of the electric grid."

## **BACKGROUND: RGGI**

- The Regional Greenhouse Gas Initiative (RGGI) program is a carbon cap-and-trade program covering fossil fuel-fired electric generating units in nine northeast and mid-Atlantic states
  - NY, ME, NH, VT, MA, RI, CT, DE, MD
- Covered sources purchase allowances in quarterly auctions run by RGGI, Inc., with the revenue returned to states

## **BACKGROUND: EO 57 Work Group recommendations**

- First recommendation: "The Work Group recommends that the Governor consider taking action via a regulatory process to establish a 'trading-ready' carbon emissions reduction program for fossil fuel fired electric generating facilities that will enable participation in a broader, established multi-state carbon market."

## **BACKGROUND: AG Opinion**

- May 12, 2017: Virginia Attorney General issued an official advisory opinion that concluded the board is legally authorized to regulate GHG
- "The Board has the authority to establish a statewide cap on GHG emissions for all new and existing fossil fuel electric generating plants as a means of abating and controlling such emissions"

## **BACKGROUND: Executive Directive 11**

- May 16, 2017: Governor McAuliffe issued ED 11 directing DEQ to develop a proposed regulation for the board's consideration to abate, control, or limit carbon dioxide emissions from electric power facilities that:
  - Includes provisions to ensure that Virginia's regulation is trading-ready to allow for the use of market-based mechanisms and the trading of CO<sub>2</sub> allowances through a multi-state trading program; and
  - Establishes abatement mechanisms providing for a corresponding level of stringency to limits on CO<sub>2</sub> emissions imposed in other states with such limits



# **GOVERNOR'S OBJECTIVE**

- Prepare a proposed carbon cap and trade rule for new and existing fossil-fuel electric power generating facilities that is trading ready to present to the board before the end of the year
- Under existing board authority
- Linkable to the RGGI program

# **REGULATORY PROCESS**

- Full regulatory adoption process
- Action is necessary to meet state executive branch requirements
- Public input is important; thoroughness of the standard process gives all interested parties opportunity to scrutinize proposal and provide feedback

# **REGULATORY PROCESS**

- June 26: Notice of Intended Regulatory Action (NOIRA) published in Virginia Register
- June 26-July 26: Public comment period  
>2500 commenters
- August-September: Regulatory Advisory Panel (RAP)
- September-October: Proposed regulation
- November 16: Proposed regulation to the board

# **REGULATORY PROCESS: RAP**

- Regulatory Advisory Panel (RAP) created
  - 15 members/alternates
  - Clean Power Plan (CPP) stakeholders group
  - Primary focus: allocating allowances
- August - September meetings
- Final group report sent to board 10/6/17
  - No consensus reached on any specific topic

# **PROPOSED REGULATION: STRUCTURE**

- Carbon cap-and-trade program commencing in 2020
- Framework is RGGI August 2017 model rule
- Modified to operate as a Virginia rule with additional provisions and modifications
  - Allocation of "conditional allowances" to covered sources with required consignment to RGGI auctions

# **PRESENTATION TOPICS**

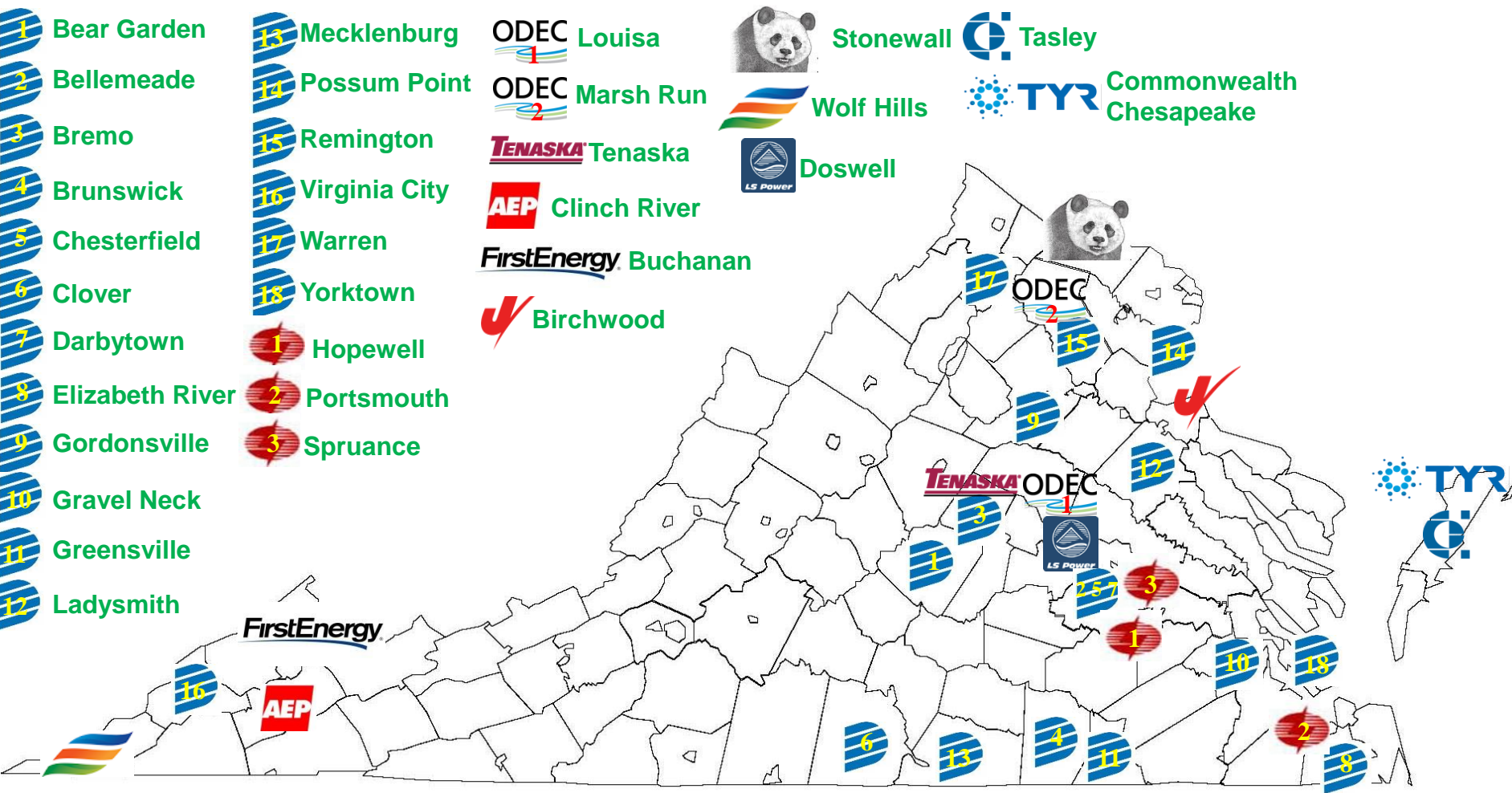
- Applicability – covered sources
- Allowances – CO<sub>2</sub> budgets
- Allocations
- Consignment auction approach
- Compliance
- Other regulatory components
- Modeling results
- Regulatory process
- Department recommendation

# **COVERED SOURCES**

- Fossil fuel-fired electric generating units
  - 25 MW and greater
  - Fossil fuel 10% or greater of total fuel mix
  - Referred to as "CO<sub>2</sub> Budget Sources"
  - Each CO<sub>2</sub> Budget Source must hold a CO<sub>2</sub> allowance for every ton of CO<sub>2</sub> emitted during a "Control Period"
- Industrial units exempted
  - Owned by and located at an industrial facility
  - Primarily used to provide power/heat to that facility

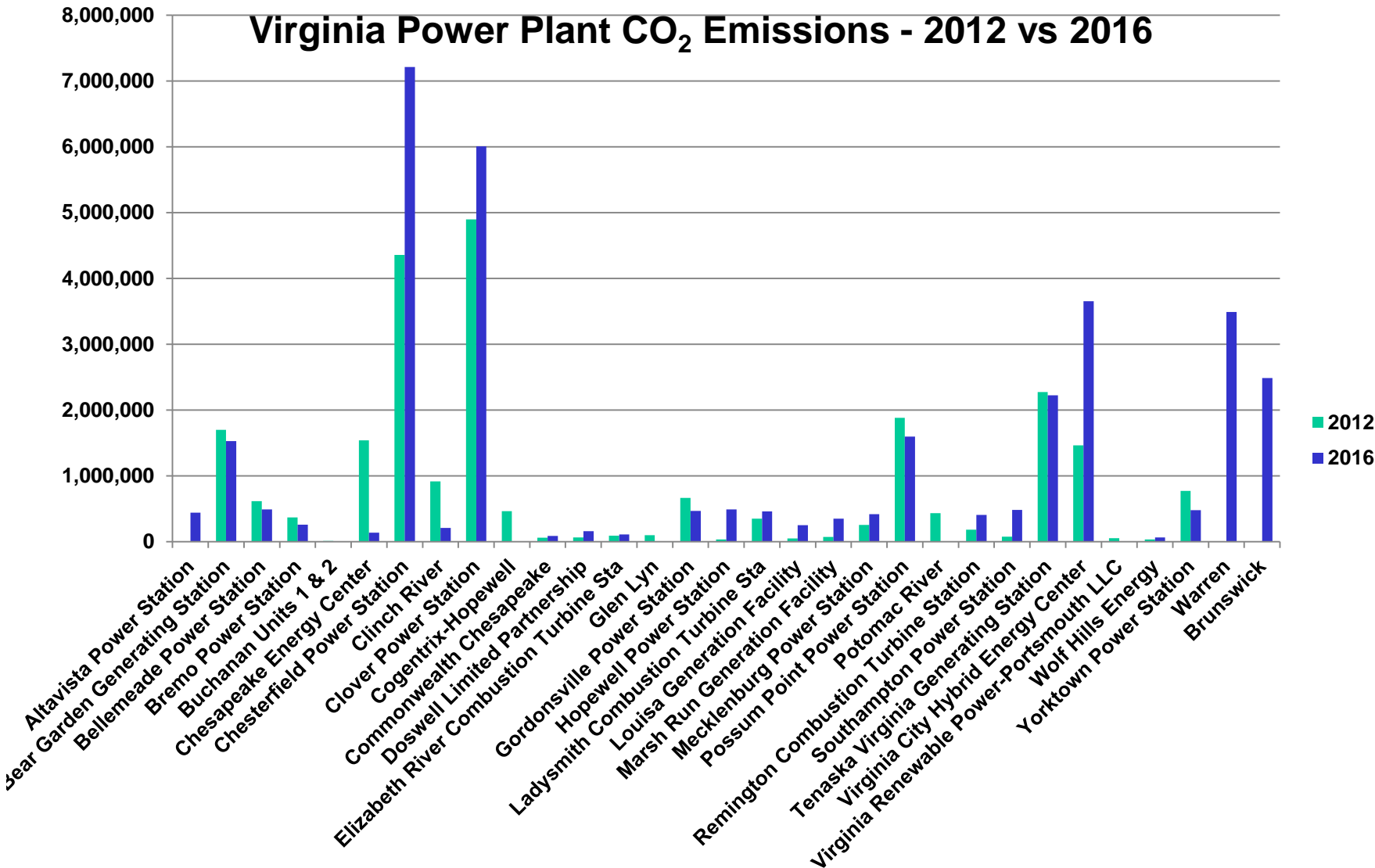
# State Air Pollution Control Board

November 16, 2017



Fossil fuel-fired electric generating units  
with  $\geq 25$  MW capacity





Source: EPA Air Markets Program Data (AMPD)

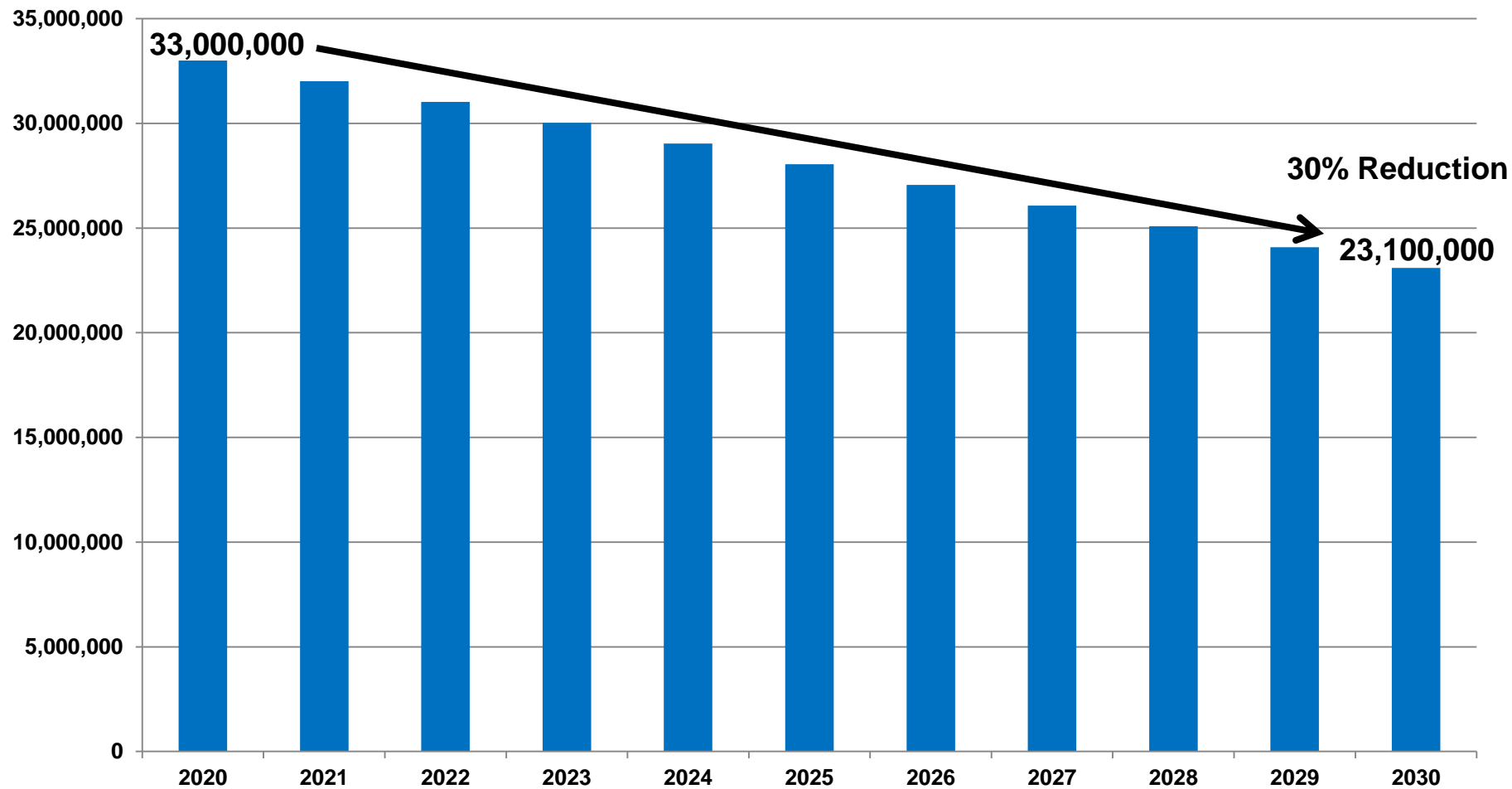
## **CO<sub>2</sub> BUDGETS**

- **CO<sub>2</sub> Base Budget**
  - Commences in 2020 with 33 *OR* 34 million allowances
  - Base budget declines about 3% per year thereafter
  - ECR allowance withdrawal adjustments based on "low" auction price triggers determined by RGGI
  - 2025 banked allowance adjustment determined by RGGI
- **Cost Containment Reserve (CCR) Budget**
  - In addition to CO<sub>2</sub> Base Budget
  - 10% of CO<sub>2</sub> Base Budget
  - CCR allowances released into auction based on "high" allowance price triggers determined by RGGI

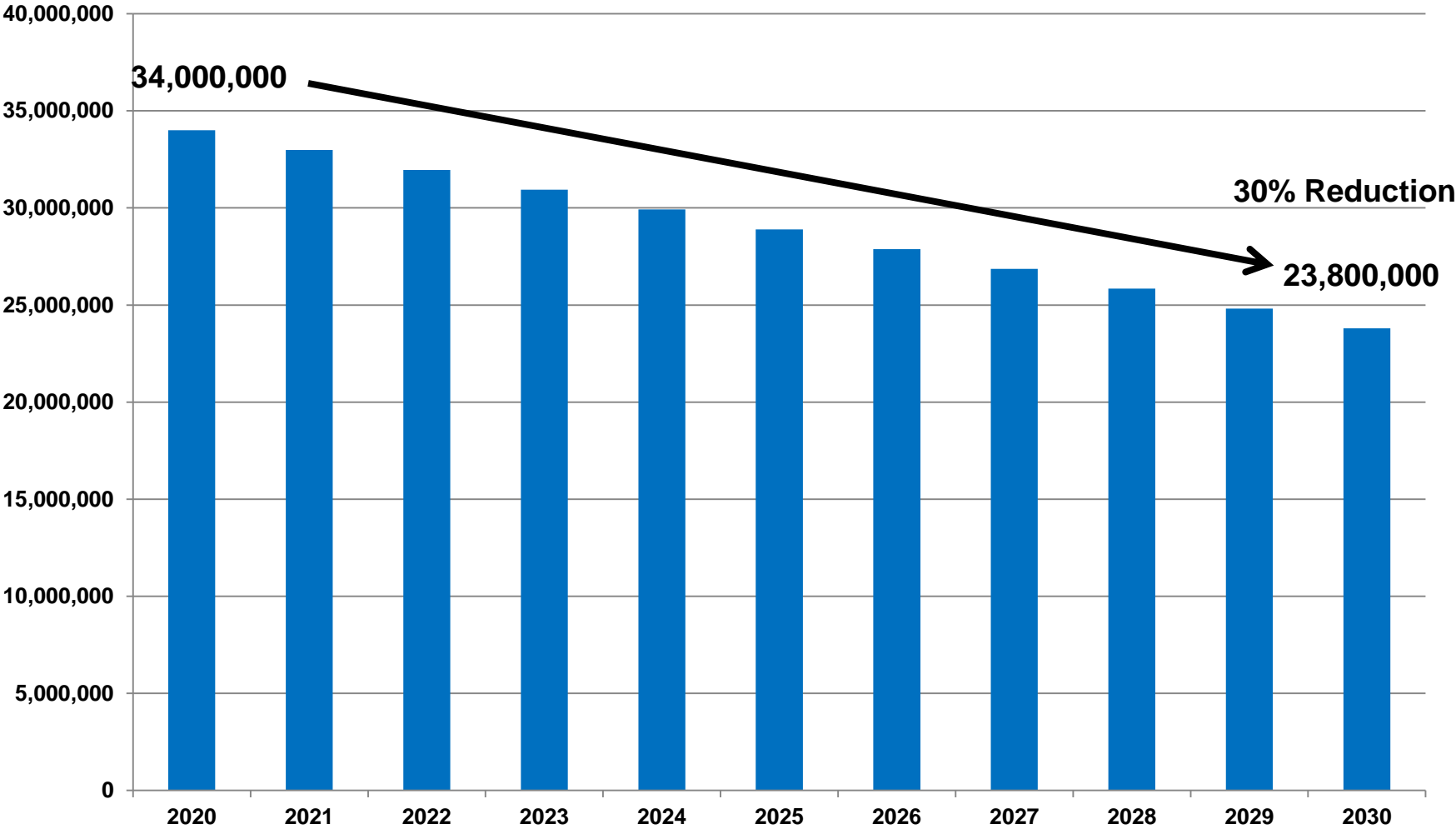
# **CO<sub>2</sub> BASE BUDGETS**

- Proposed rule presents for public comment two alternate initial CO<sub>2</sub> Base Budgets commencing in 2020
  - 33 million tons based on ICF Reference Case (business as usual) modeling using Virginia assumptions
  - 34 million tons based on ICF Reference Case modeling using RGGI assumptions

**Proposed Trading Rule Yearly CO<sub>2</sub> Emission Caps**



**Proposed Trading Rule Yearly CO<sub>2</sub> Emission Budgets**



## **CO<sub>2</sub> BASE BUDGET ALLOCATIONS**

- 95% of Base Budget allocated annually to CO<sub>2</sub> Budget Sources as "Conditional Allowances" that must be consigned to the RGGI quarterly auctions
  - Allowances for compliance must be purchased at auction
  - CO<sub>2</sub> Budget Sources compensated for conditional allowances consigned to auction at auction clearing price by auctioneer
  - Allocations to CO<sub>2</sub> Budget Sources based on "output updating" method
    - Megawatt hours (MWh) of generation averaged over three years
    - Allocation updating will capture new and retired sources
    - Should reduce generation "leakage"
    - Updated in 2021 and every three years thereafter

## **CO<sub>2</sub> BASE BUDGET ALLOCATIONS**

- 5% of Base Budget allocated annually to Dept. of Mines, Mineral, & Energy (DMME) to assist DEQ for the abatement and control of air pollution, in particular CO<sub>2</sub>
  - Allocation in the form "Conditional Allowances" that must be consigned to the RGGI auctions by the holder of public contract with DMME

## **CONSIGNMENT AUCTION APPROACH**

- Conditional Allowances are consigned by CO<sub>2</sub> Budget Sources and holders of public contracts with DMME to the RGGI auctions
  - Auctions managed by RGGI, Inc.
  - Anyone can buy allowances at RGGI auctions
- Cost of allowances determined by auction clearing price
- Sources cannot use Conditional Allowances for compliance
- Revenue is returned to CO<sub>2</sub> Budget Sources and entities designated by DMME by auctioneer for consigned Conditional Allowances sold at auction
- Revenue received by CO<sub>2</sub> Budget Sources owned by regulated electric utilities flow to rate payers pursuant to State Corporation Commission (SCC) requirements



## **COMPLIANCE**

- Must hold allowances for CO<sub>2</sub> emissions during "Control Periods"
- Three Year Control Periods beginning in 2021
  - *BUT* must hold at least 50% of required allowances in each of the two initial years of a control period
  - Banking of allowances permitted, but can't "borrow" against future allowances
- 2020 is a Single Year Control Period
  - Necessary to coordinate with RGGI control periods
- Penalties for non-compliance

## **OTHER COMPONENTS**

- Other provisions needed to administer program and ensure compliance
  - CO<sub>2</sub> Authorized Account Representative/alternate
  - Permits
  - Compliance certification
  - Allowance tracking system
  - Allowance transfers
  - Monitoring and reporting
- Drawn from RGGI model rule
  - Based on requirements in other trading programs such as acid rain and NO<sub>x</sub>
  - 40 CFR Part 75

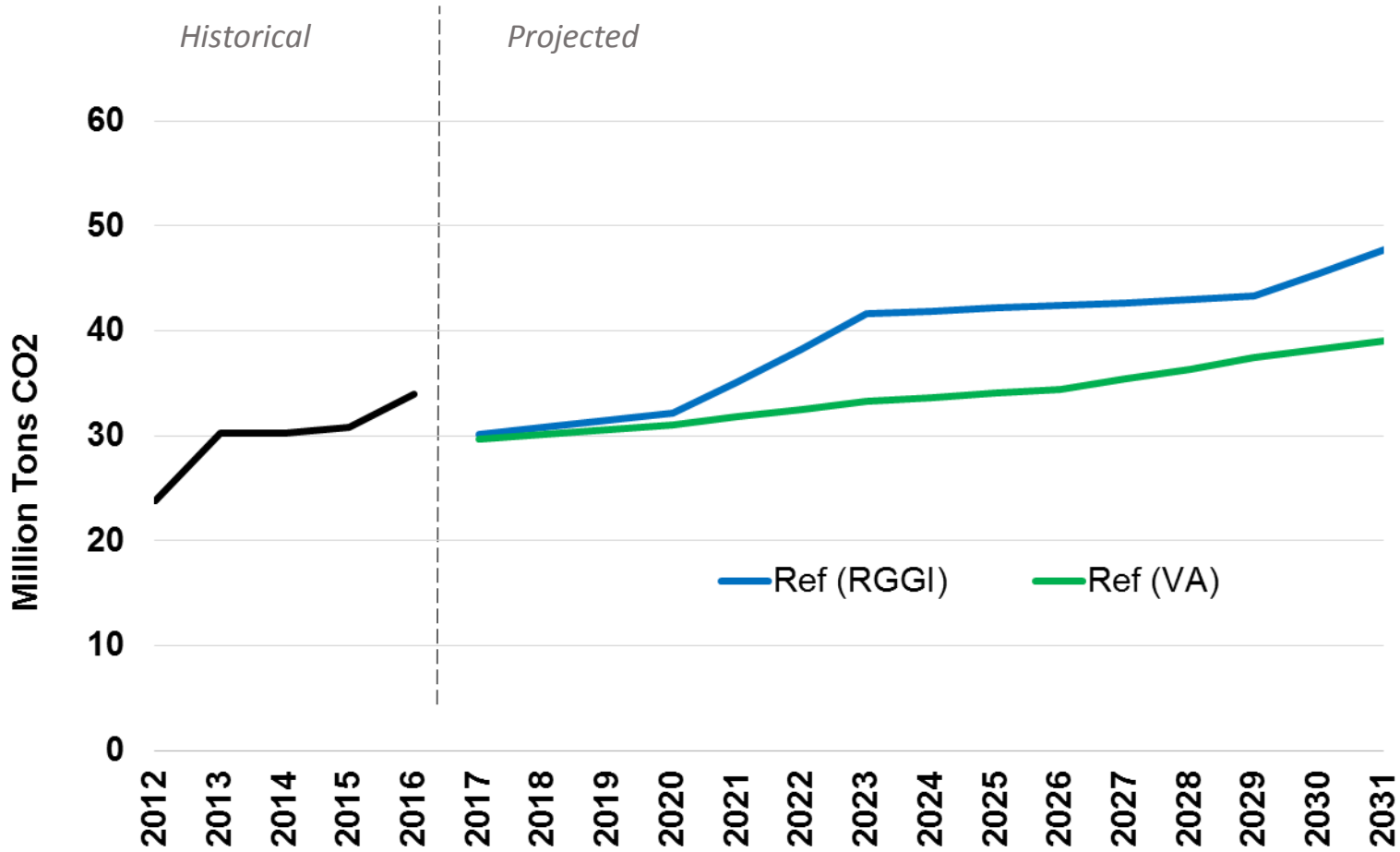
## **ICF MODELING**

- The Georgetown Climate Center contracted with ICF to analyze the potential impacts of Virginia's participation in RGGI
- Virginia DEQ specified the assumptions, sources and scenario specifications for the analysis
- VA Reference Cases
  - One uses assumptions provided by VA DEQ
  - One uses same assumptions used by RGGI states
- VA Policy Scenarios
  - Modeled a cap in VA similar to RGGI and linked to RGGI, against both reference cases

# Reference Cases with RGGI Assumptions and VA Assumptions

Assumption	Reference with <u>RGGI</u> Assumptions	Reference with <u>VA</u> Assumptions
Gas Prices (2017-2031 Avg., 2015\$/MMBtu)	Average of AEO 2017 Reference Case and High Resource Case (\$3.84)	2017 Dominion IRP, Appendix 4A, ICF CPP Commodity Case, No CO <sub>2</sub> Cost Case, and Scenario Price Forecast; Natural Gas. No CO <sub>2</sub> Case (\$3.94)
DOM Zone Load and Peak	PJM 2017 Load Forecast	2017 Dominion IRP
Firm Builds	RGGI Reference Case	2017 Dominion IRP
Other Assumptions	2017 RGGI Reference Case	

# VA Affected Sources CO<sub>2</sub> Emissions



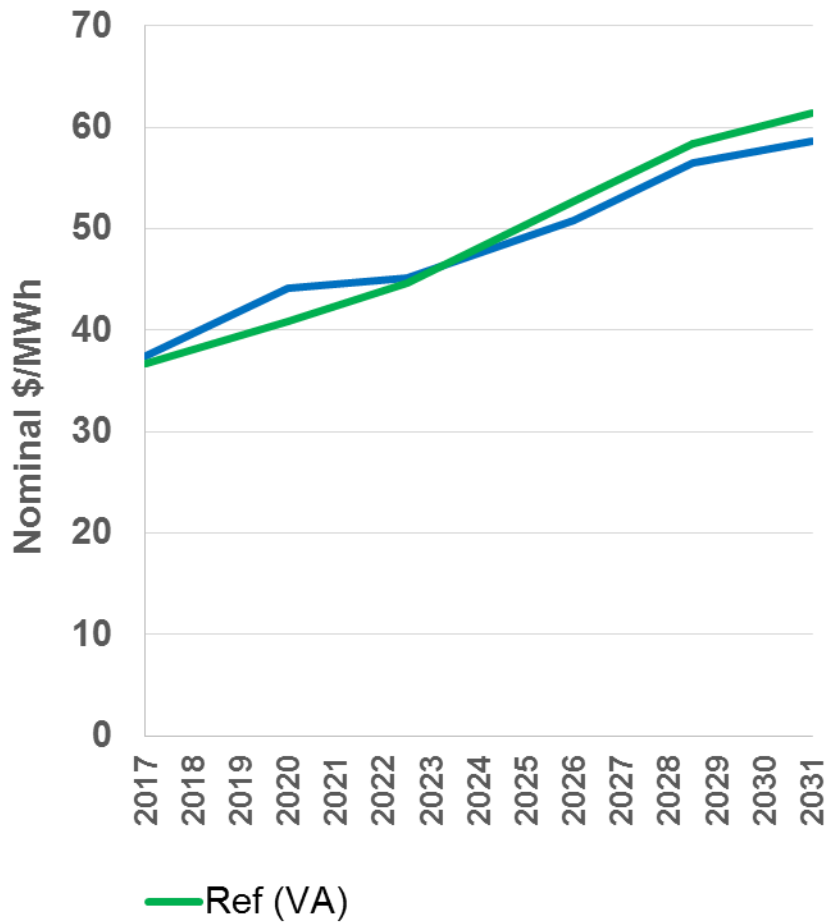
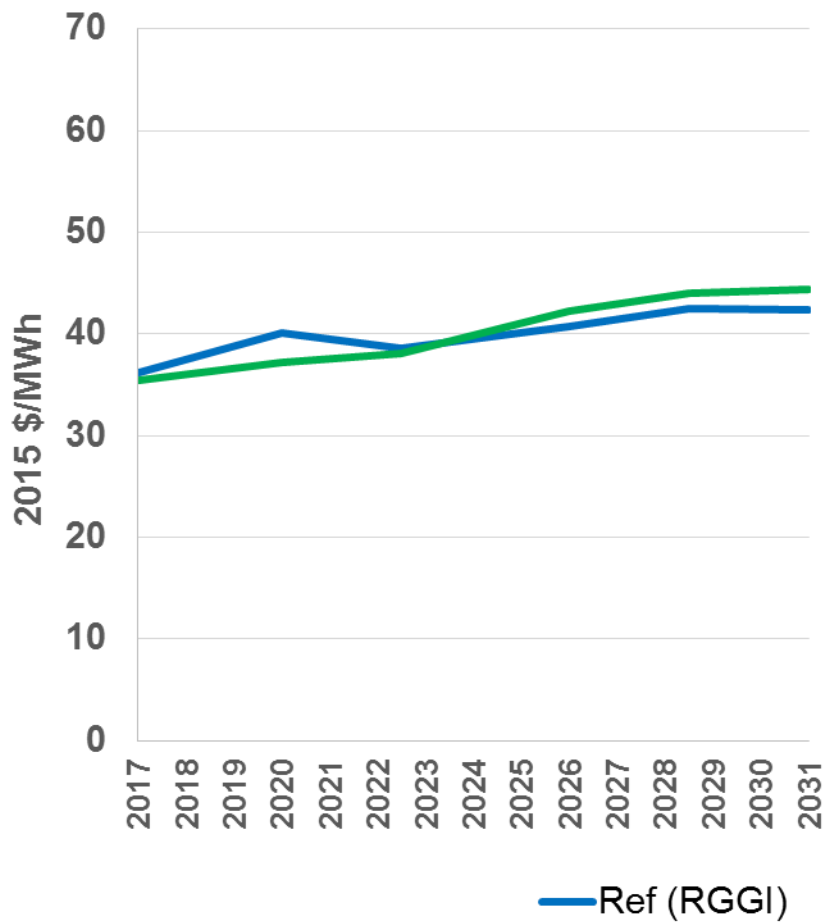
Note: Model assumes that any allowance bank is fully exhausted in 2031 and in 2032, emissions would immediately drop to cap levels

# State Air Pollution Control Board

## VA Firm Power Prices

November 16, 2017

- The chart shows the projected VA average annual firm (energy + capacity) prices in constant 2015 and nominal dollars.

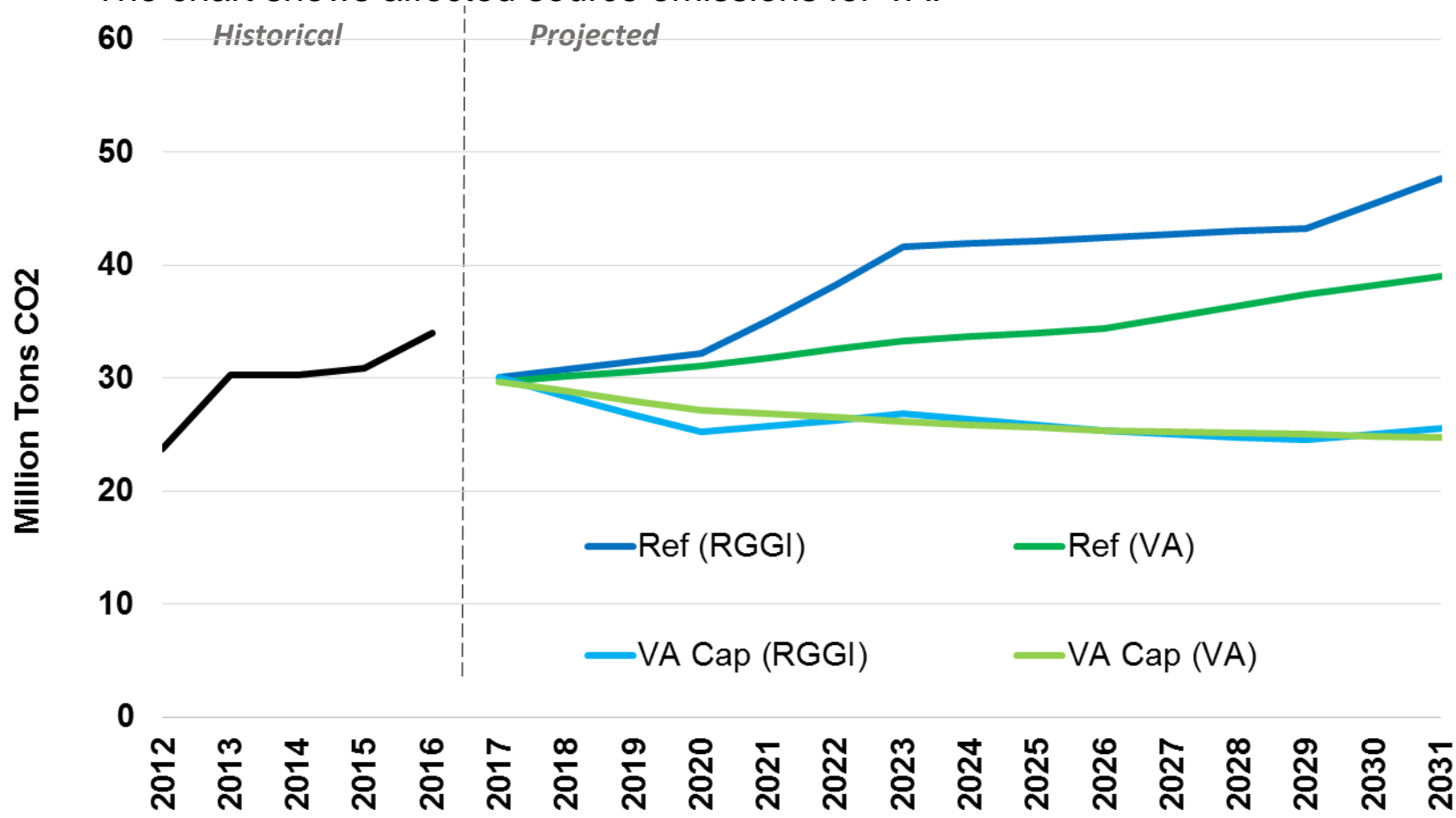


# **VA Cap Policy under RGGI and VA Assumptions**

<b>Assumption</b>	<b>Policy Case with RGGI and VA Assumptions</b>
RGGI Cap	Cap declines 3MM in 2021 and then 2.275MM per year thereafter through 2030 (adjusted cap in 2017-2025)
Virginia Incremental Cap	Added to RGGI Cap; VA trades with RGGI states Starts at 2020 modeled Virginia emissions. Cap declines consistent with RGGI Model Rule Policy Scenario, achieving 30% reduction by 2030
CCR Quantity	10MM allowances in 2017-2020 and then 10% of the annual base cap in 2021 onwards
ECR Quantity	9.1% of the annual base cap in 2021 and onwards
RGGI Trading	Trading of RGGI allowances among RGGI states and VA
Banking	Unlimited banking across the model horizon

# VA Affected Source CO<sub>2</sub> Emissions

- The chart shows affected source emissions for VA.

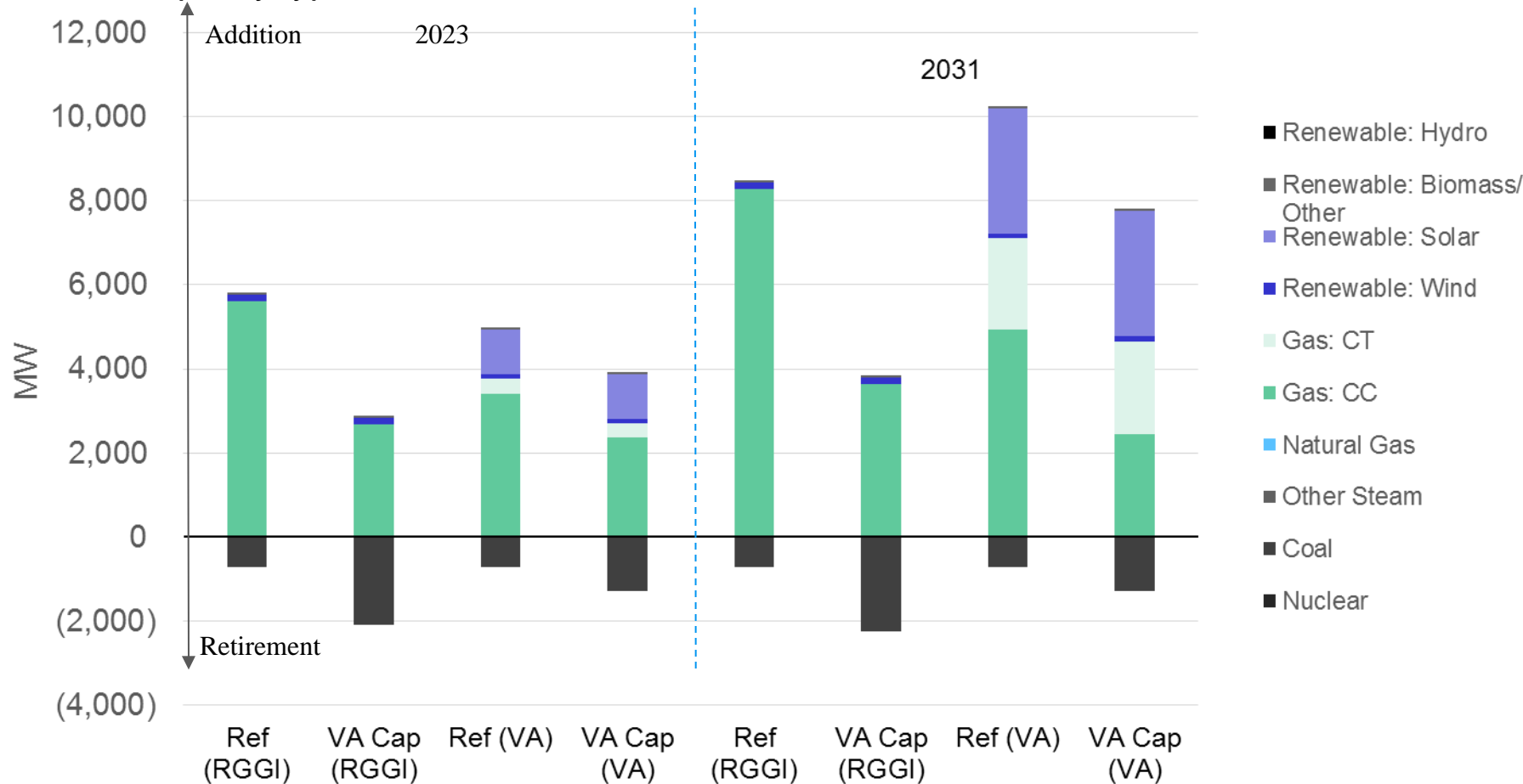


Note: Model assumes that any allowance bank is fully exhausted in 2031 and in 2032, emissions would immediately drop to cap levels



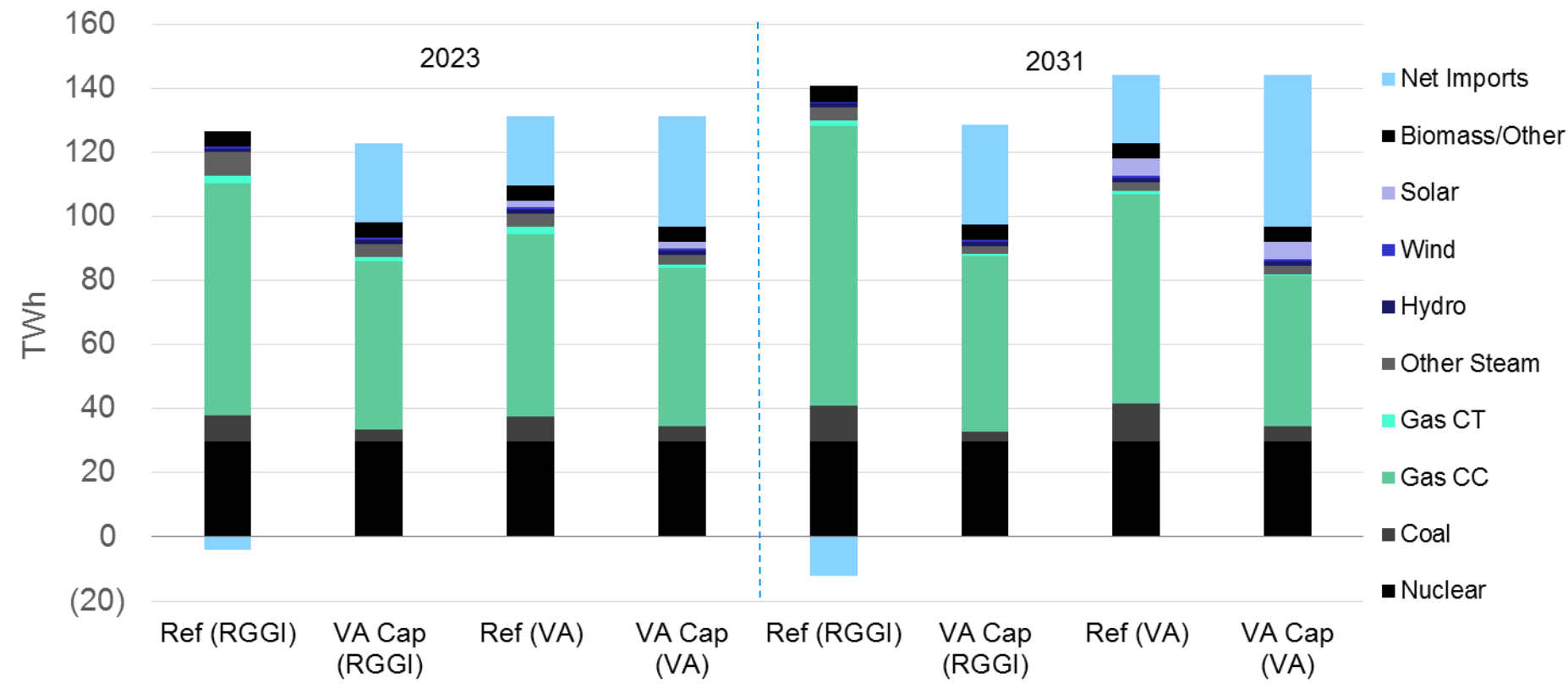
# VA Cumulative Capacity Additions

- The chart shows the distribution of capacity additions and retirements by capacity type.



# VA Generation Mix

- The chart shows generation by type and net imports for VA.



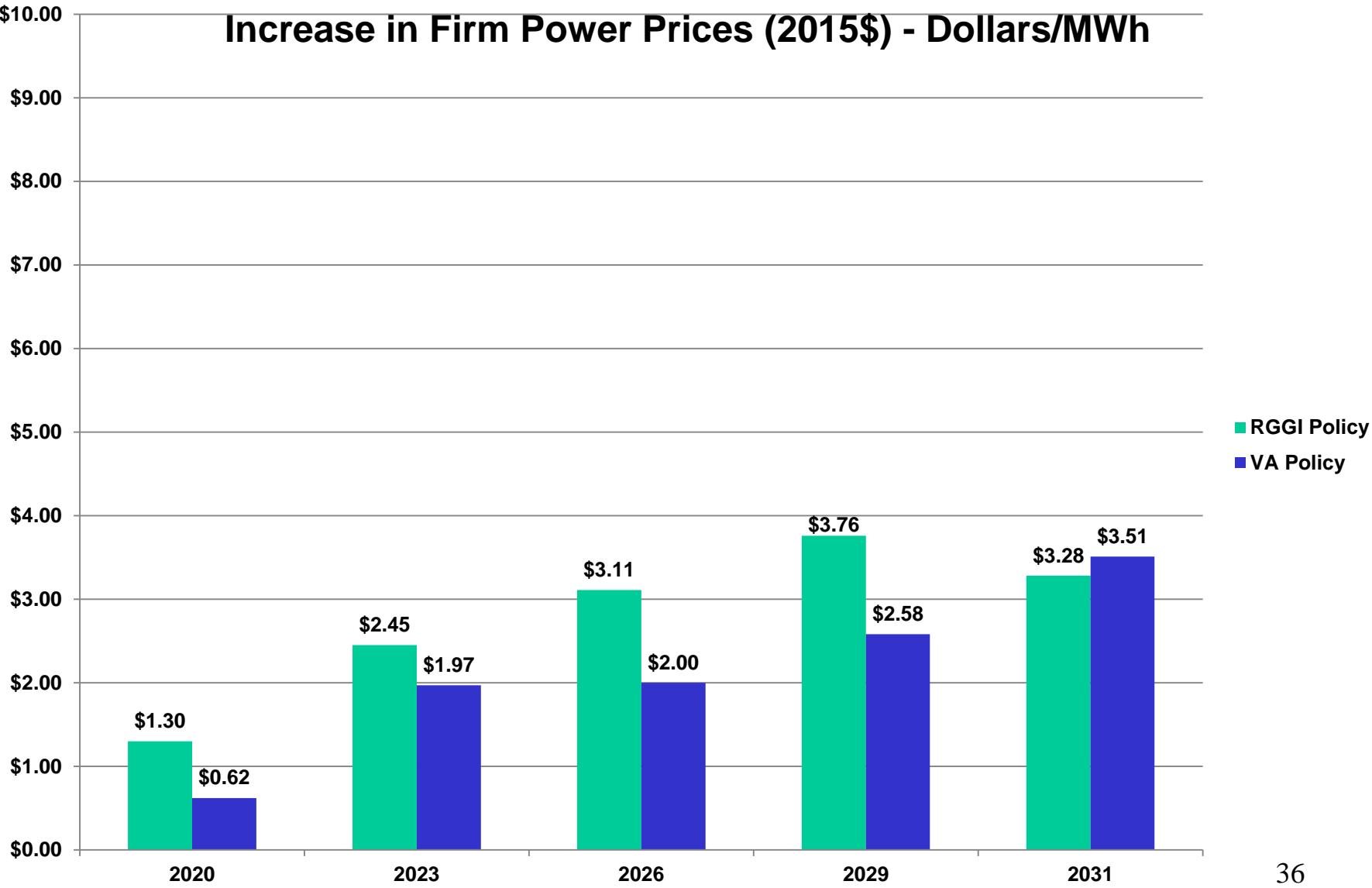
**VA Firm Power Prices**

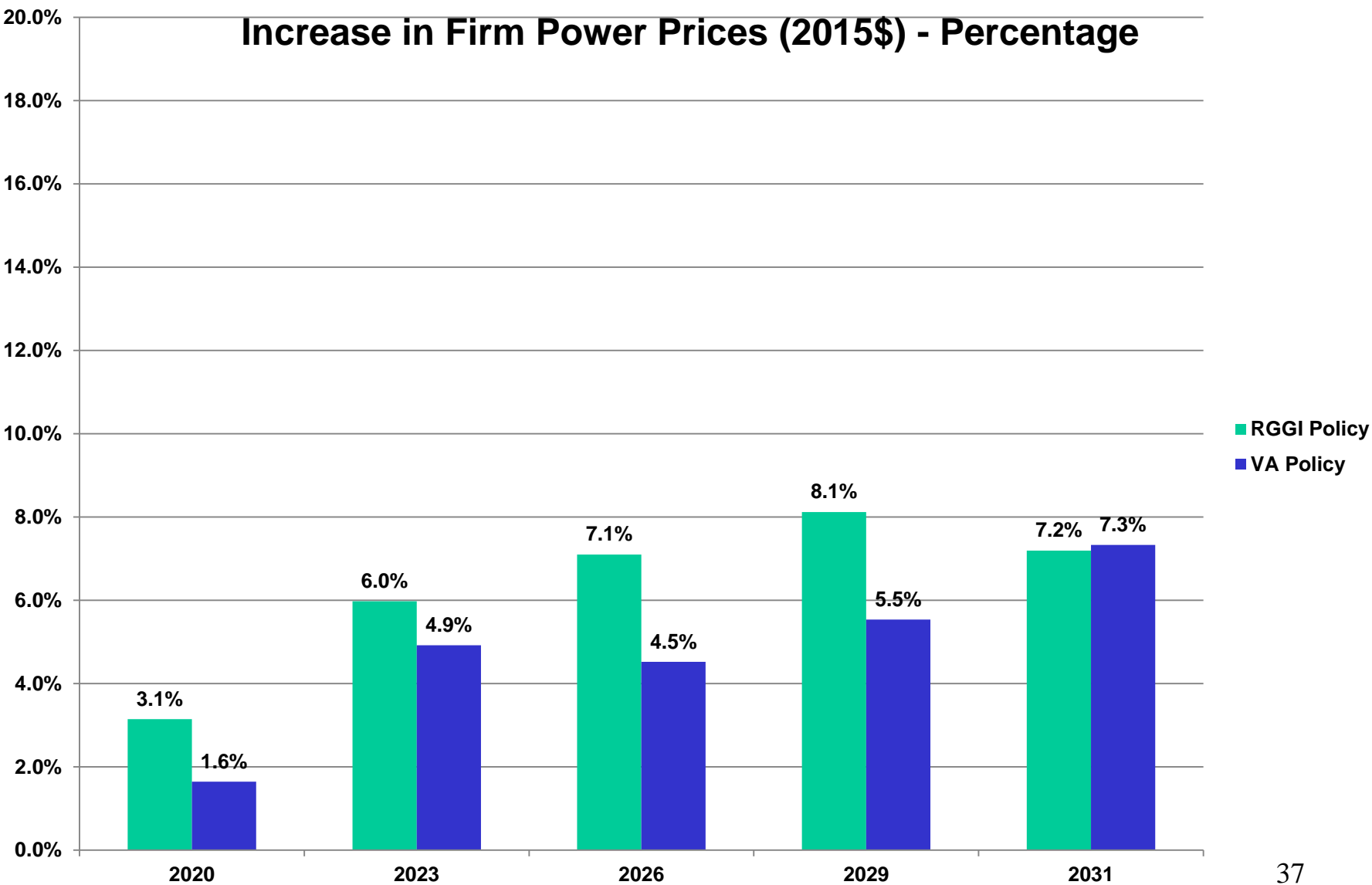
*2015\$/MWh*

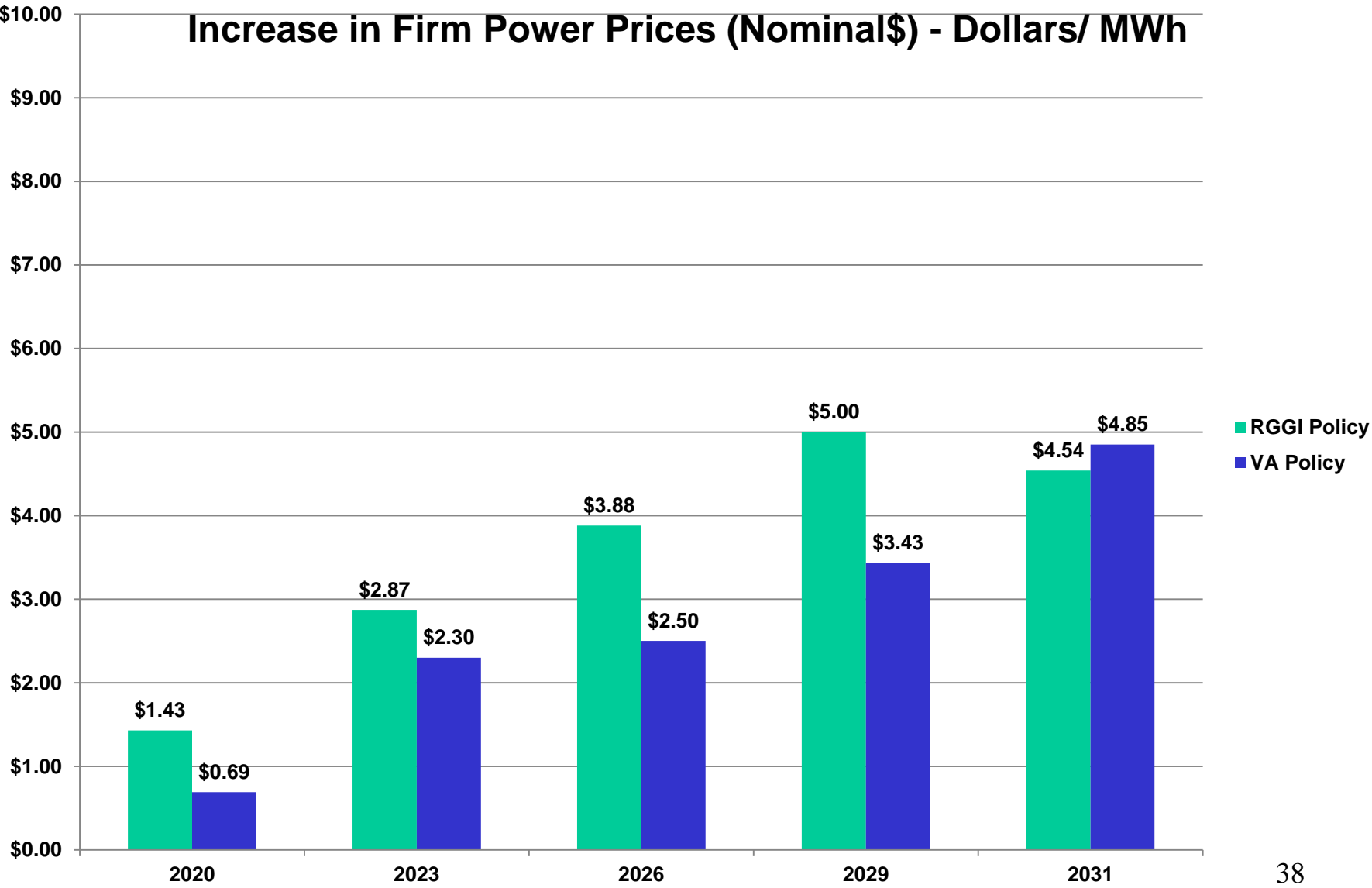
Case	2020	2023	2026	2029	2031
Ref (RGGI)	\$40.08	\$38.57	\$40.70	\$42.55	\$42.33
Ref (VA)	\$37.16	\$38.07	\$42.26	\$44.02	\$44.41
VA Cap (RGGI)	\$41.38	\$41.02	\$43.81	\$46.31	\$45.61
VA Cap (VA)	\$37.78	\$40.04	\$44.26	\$46.60	\$47.92

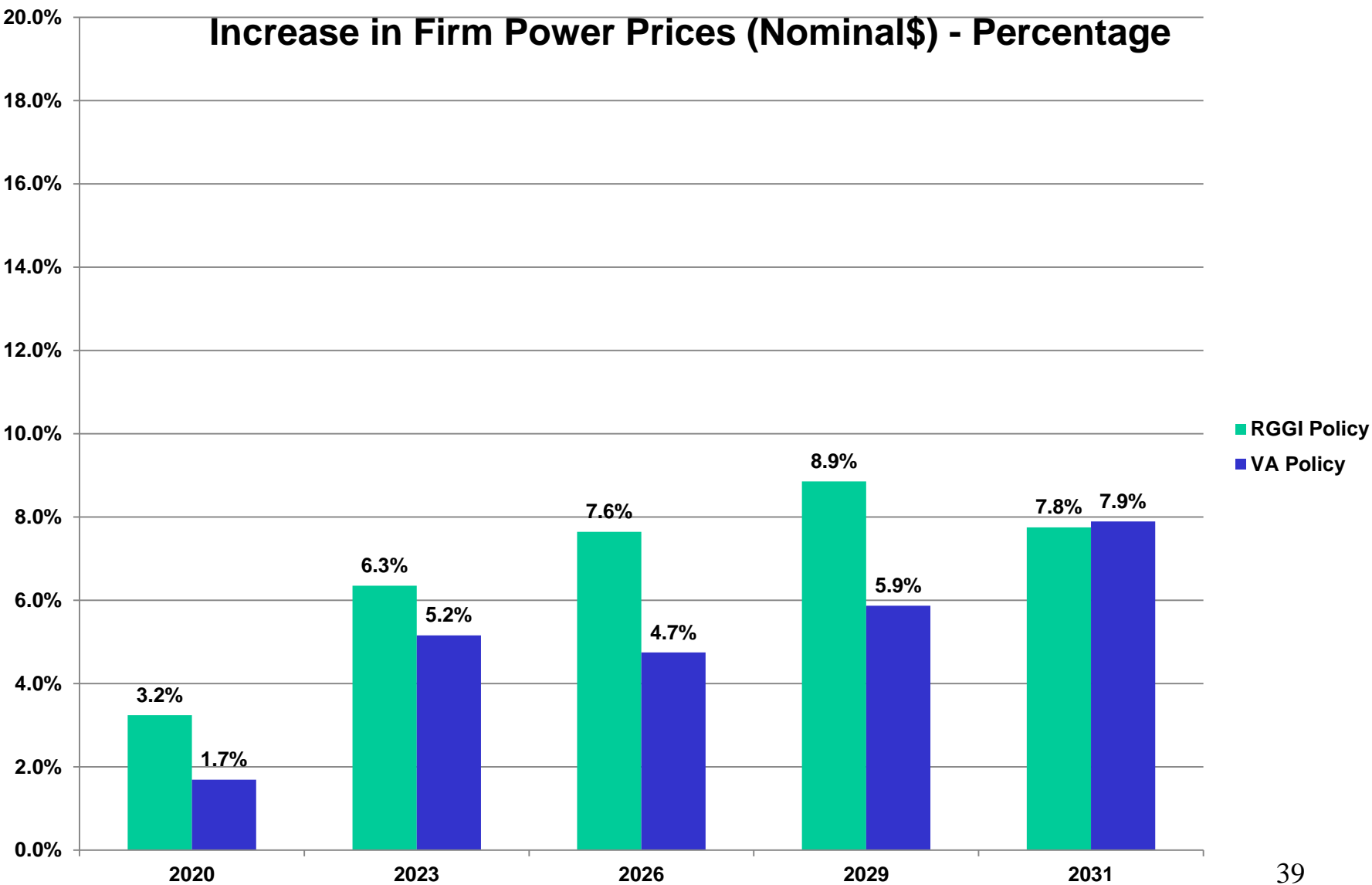
*Nominal\$/MWh*

Case	2020	2023	2026	2029	2031
Ref (RGGI)	\$44.13	\$45.20	\$50.76	\$56.48	\$58.57
Ref (VA)	\$40.91	\$44.62	\$52.70	\$58.43	\$61.46
VA Cap (RGGI)	\$45.56	\$48.07	\$54.64	\$61.48	\$63.11
VA Cap (VA)	\$41.60	\$46.92	\$55.20	\$61.86	\$66.31









RGGI Allowance Prices

2015\$/Ton

Case	2020	2023	2026	2029	2031
Ref (RGGI)	\$5.96	\$6.67	\$7.80	\$8.73	\$9.77
Ref (VA)	\$6.27	\$7.01	\$8.20	\$9.18	\$10.27
VA Cap (RGGI)	\$5.88	\$6.58	\$7.70	\$8.62	\$9.64
VA Cap (VA)	\$5.52	\$6.18	\$7.23	\$8.09	\$9.06

Nominal\$/Ton

Case	2020	2023	2026	2029	2031
Ref (RGGI)	\$6.56	\$7.81	\$ 9.73	\$11.58	\$13.51
Ref (VA)	\$6.90	\$8.22	\$10.23	\$12.19	\$14.22
VA Cap (RGGI)	\$6.48	\$7.71	\$ 9.60	\$11.44	\$13.35
VA Cap (VA)	\$6.08	\$7.24	\$ 9.02	\$10.74	\$12.53



***State Air Pollution Control Board***

***November 16, 2017***

# Virginia IPM Scenario Customer Bill Analysis

November 9, 2017

**Average Electric Monthly Bills (\$2015)  
Residential Customers  
RGGI Assumptions**



**Residential Average Bills**  
Policy Scenario & Reference Case with RGGI Assumptions (2020-2031)

Virginia Average Bill Impacts  
IPM Scenario Summary Comparison

VA Monthly Bill Impact for Years 2017-2031

Customer Class	Reference Case Bill (\$2015)		Policy Scenario			
	RGGI Assumptions	RGGI + VA Assumptions	RGGI Assumptions		RGGI + VA Assumptions	
			Monthly Difference	Percent	Monthly Difference	Percent
			(\$2015)	Difference	(\$2015)	Difference
Residential	\$ 181.42	\$ 181.82	\$ 1.19	0.7%	\$ 0.53	0.3%
Commercial	\$ 1,019.44	\$ 1,022.67	\$ 9.59	0.9%	\$ 4.24	0.4%
Industrial	\$ 33,934.27	\$ 34,065.64	\$ 370.20	1.1%	\$ 154.55	0.5%

## **REGULATORY PROCESS: WHAT'S NEXT**

- November 16: Proposed regulation to the board
- Executive review:
  - Department of Planning and Budget
  - Secretary of Natural Resources
  - Governor
- Publication in Virginia Register
  - Commences a 60-day public comment period
  - At least one public hearing
- Final stage

## **Department Recommendation:**

That the board approve the proposal and authorize the department to promulgate the proposal for public comment.